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(54) Automatic displays for incoming telephone calls

(57) A method of processing incoming telephone calls is comprised of receiving an incoming call, and routing it to a called telephone, displaying a icon related to the incoming call in a dominant manner on a computer display of a computer associated with the called telephone, automatically retrieving a file related to an identity of a calling line of the incoming call from a database, and providing foreground access to the file to an operator of the computer.

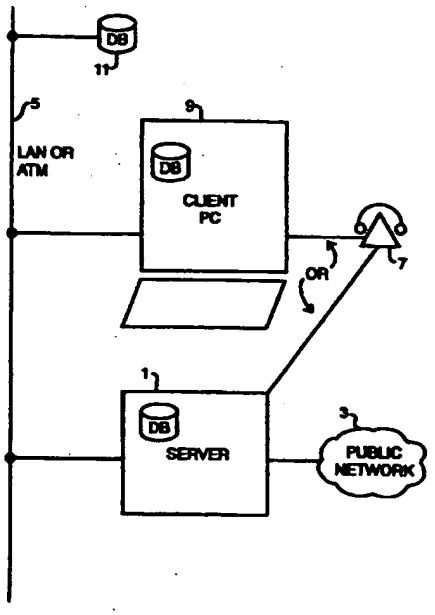

FIG. 1

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At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.

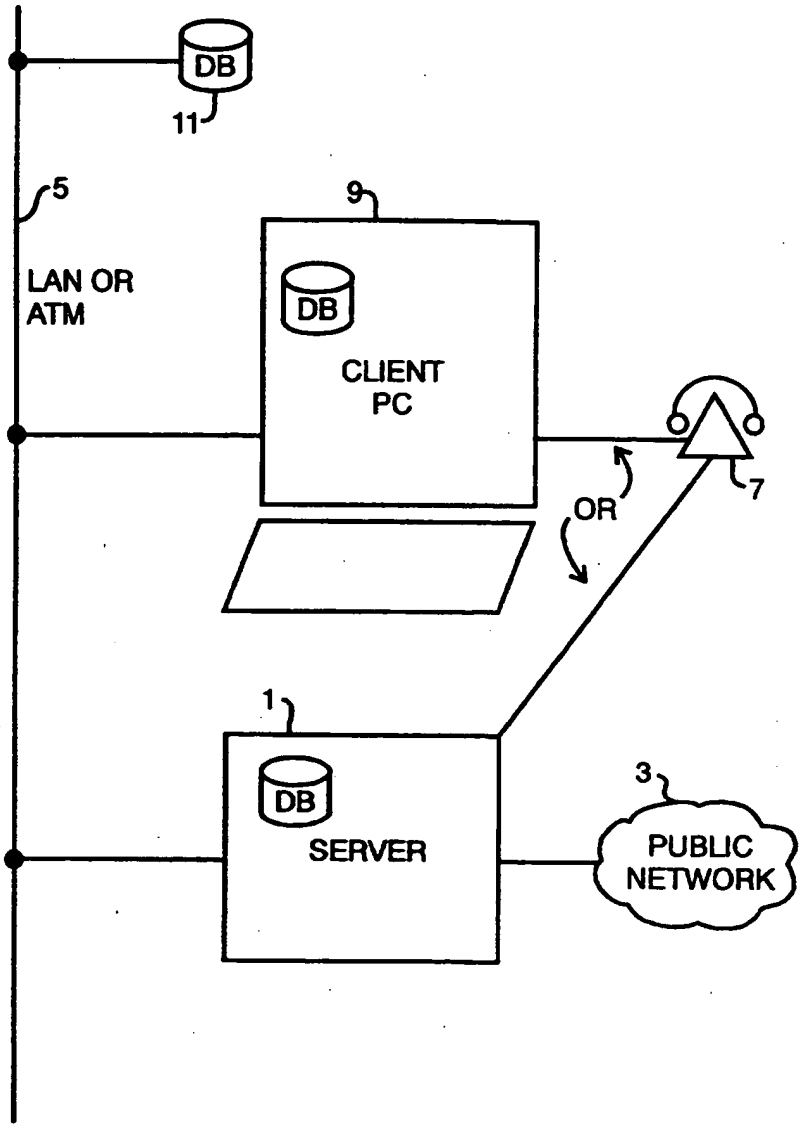
DB
11
5
LAN OR
ATM
9
DB
CLIENT
PC
OR
7
1
DB
SERVER
3
PUBLIC
NETWORK

FIG. 1

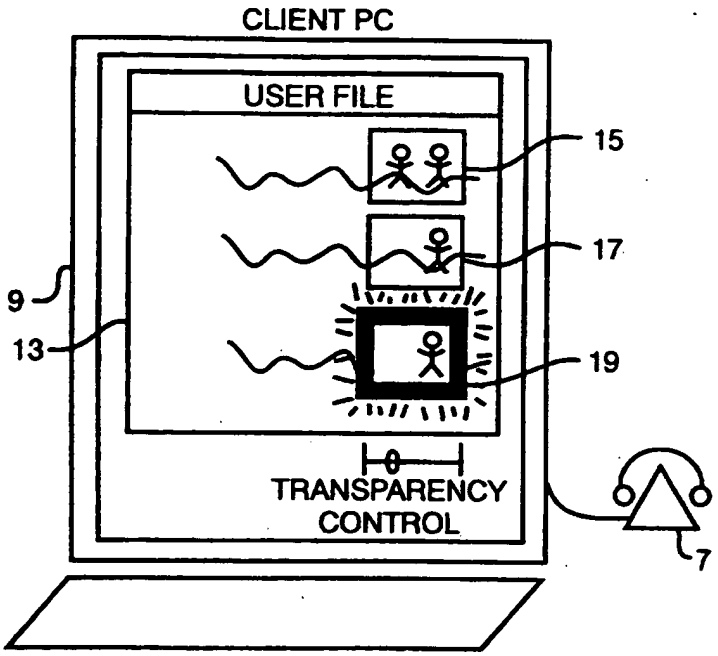
CLIENT PC
USER FILE
15
17
19
9
13
TRANSPARENCY CONTROL
7

FIG. 3

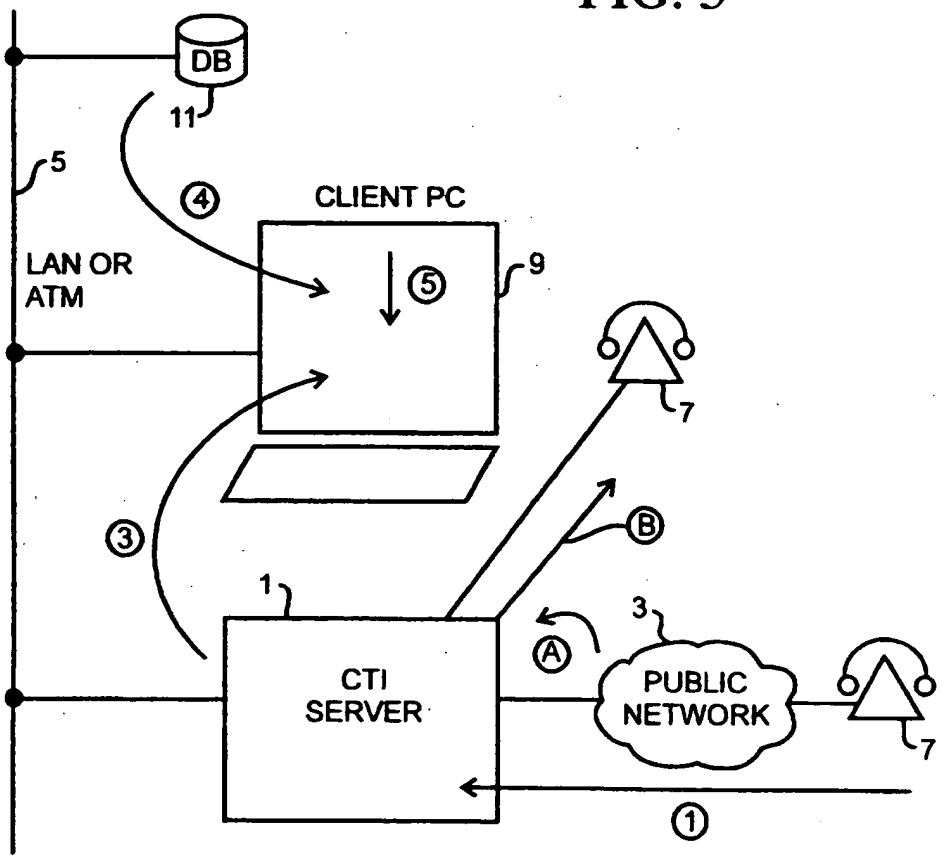
DB
11
5
4
CLIENT PC
LAN OR ATM
5
9
7
3
B
1
A
3
CTI SERVER
PUBLIC NETWORK
7
1

FIG. 2

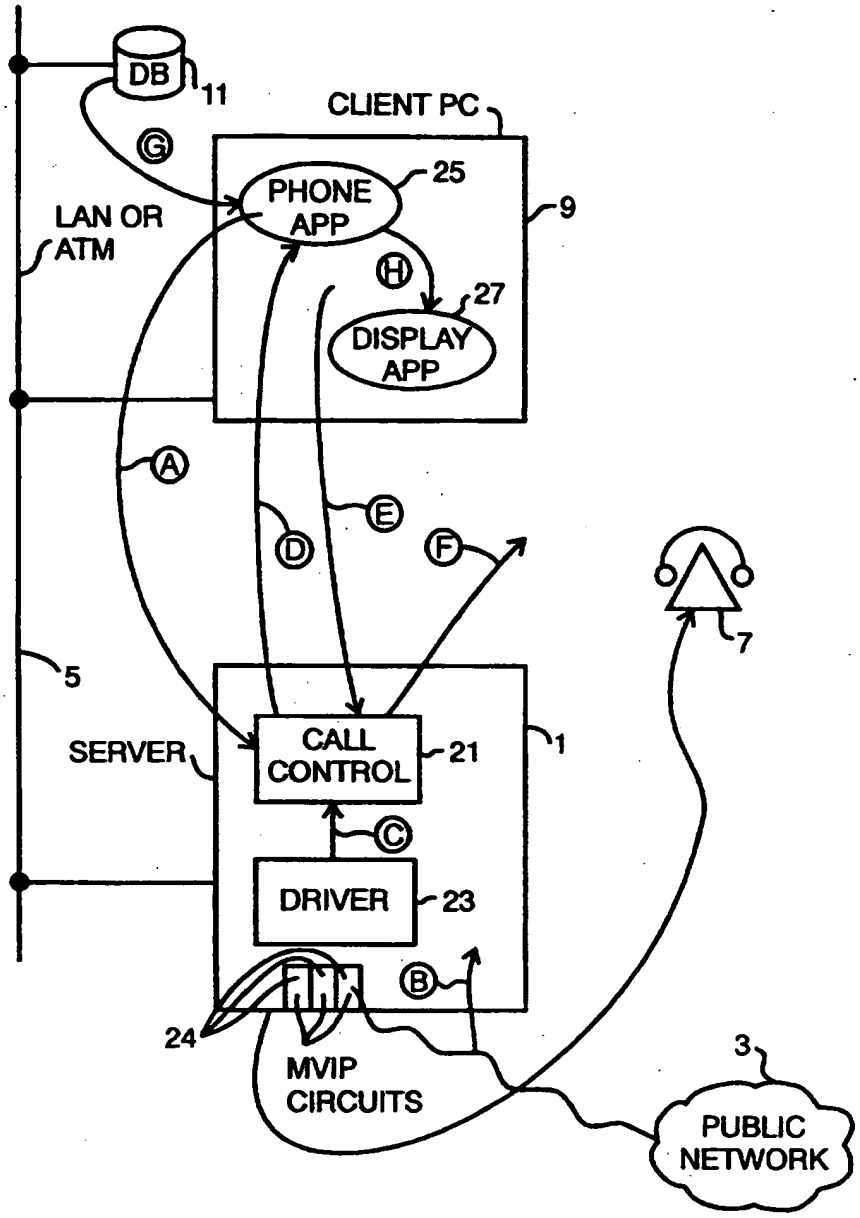
DB
11
CLIENT PC
G
PHONE APP
25
9
LAN OR ATM
H
27
DISPLAY APP
A
E
D
F
7
5
SERVER
CALL CONTROL
21
1
C
DRIVER
23
B
24
MVIP CIRCUITS
3
PUBLIC NETWORK

FIG. 4

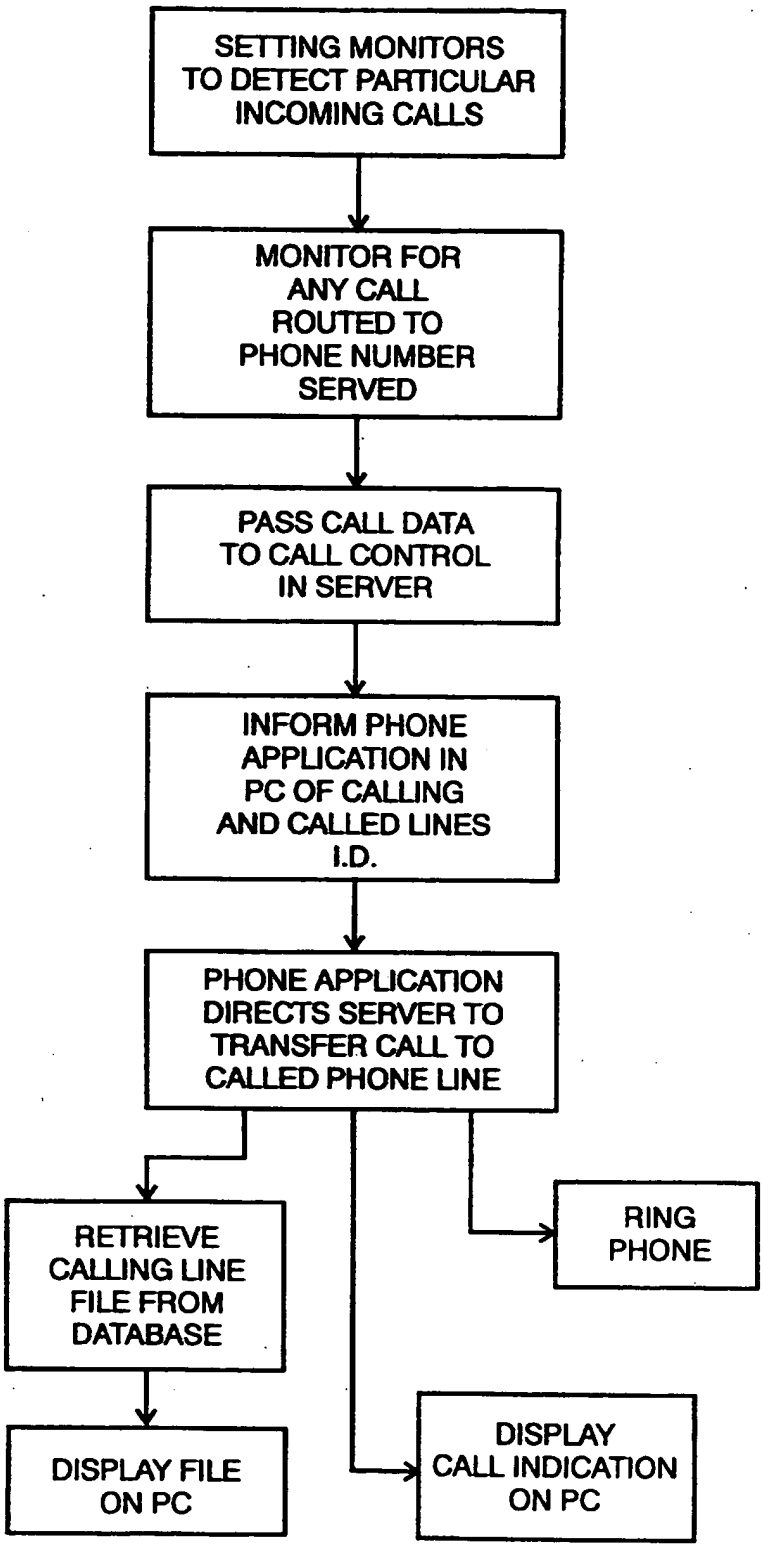
SETTING MONITORS TO DETECT PARTICULAR INCOMING CALLS
MONITOR FOR ANY CALL ROUTED TO PHONE NUMBER SERVED
PASS CALL DATA TO CALL CONTROL IN SERVER
INFORM PHONE APPLICATION IN PC OF CALLING AND CALLED LINES I.D.
PHONE APPLICATION DIRECTS SERVER TO TRANSFER CALL TO CALLED PHONE LINE
RETRIEVE CALLING LINE FILE FROM DATABASE
RING PHONE
DISPLAY FILE ON PC
DISPLAY CALL INDICATION ON PC

FIG. 5

PROCESSING INFORMATION

This invention relates to processing information. Particular methods of processing incoming message data and telephone calls so as automatically to associate a stored file with an incoming call will be described below, by way of example, in illustration of the invention.

It has become commonplace in certain telephone usage situations to have a computer used in association with calls. For example, a PABX telephone operator may have a computer which helps process an incoming call by readily displaying a PABX local number to which the call is to be transferred. A telephone operator of a commercial establishment may have a computer bring up a file of a calling party which has been identified when the call is answered. Telephone users may use a computer to display a telephone directory, to automatically dial outgoing calls, to compose and transmit electronic mail (E-mail) messages, etc.

In the past, an operator of a computer integrated with a telephone system (CTI) would ask a calling party their name or telephone number, and type it into the computer. The computer operator would then control an application program to search a database and to bring up a file associated with the calling party. For example, the file could contain data relating to past sales to the customer, or a record of previous communications with an enterprise, or a list of equipment known to the enterprise to be used by the caller, or the accounting records of the caller, etc.

However, once the call was answered, further incoming calls would either be routed to another operator, or, if the same operator placed the initial call on hold and another call were answered, there was no ability to call up a file associated with the other call unless this were done manually by the operator. If

the file associated with the other call were called up manually, and if the file related to the first caller were on the screen of the operator's computer, the operator could get confused as to which file related to which answered call. Further, there was no ability to automatically obtain a file when the later call is answered and provide it in the foreground for unambiguous use by the operator.

In an embodiment illustrative of the present invention, files can be associated with calls, and indications of calls can be provided on a display of a computer at the same time as a file associated with a currently active call. A user can use a pointer such as a mouse to select one call of several that may be indicated on the display, to make one call active and place or maintain others on hold, and automatically have a file associated with the active call available to the user, e.g. in the foreground.

In another embodiment illustrative of the invention, a method of processing incoming telephone calls includes receiving an incoming call, and routing it to a called telephone, displaying an icon related to the incoming call in a dominant manner on a computer display of a computer associated with the called telephone, automatically retrieving a file related to an identity of a calling line of the incoming call from a database, and providing foreground access to the file to an operator of the computer.

In yet another illustrative embodiment, a method of processing incoming telephone calls includes detecting an incoming call in a telephone server, providing data relating to a calling or called party from the server to a telephone application program in a computer associated with the called party, directing the

server from the telephone application program to ring a telephone of a called party and transfer the call thereto, automatically retrieving a file from a database, by the telephone application program, and displaying from the telephone application program an icon related to the call in the foreground on a display of the computer, and providing access by the called party, to the file.

In yet a further illustrative embodiment, a method of processing an E-Mail message includes receiving an incoming message, and routing it to the computer of a recipient party, displaying an icon related to the incoming message in a dominant manner on a computer display of a computer associated with the recipient party, automatically retrieving a file related to an identity of a transmitting party of the incoming message from a database, and providing foreground access to the file to an operator of the computer.

A better understanding of the invention will be obtained by reading the following description with reference to the accompanying drawings, in which:

Figure 1 is a block diagram of a system by which the present invention can be implemented,

Figure 2 is a block diagram used to illustrate the inventive method in basic form,

Figure 3 is an illustration of a computer display as may be used in an embodiment of the invention,

Figure 4 is a block diagram used to illustrate the inventive method in more detailed form, and

Figure 5 is a flow chart of an embodiment of the present invention.

A person understanding the present invention will recognize that various hardware platforms and computer software could be used to implement the present invention. However it is preferred that the present invention be implemented using the structures described in U.S. patent application serial number 08/367,821 filed January 3, 1995, entitled ADAPTIVE COMMUNICATION SYSTEM, and U.S. patent application serial number 08/339,463 filed November 14, 1994, entitled LOCAL AREA COMMUNICATIONS SERVER SYSTEM. A basic architecure of the system described in U.S. Serial No. 08/339,463 is illustrated in Figure 1.

Referring to the drawings, a server 1, which may be connected to the public switching network 3, is connected to a local area network (LAN) 5 or asynchronous transfer mode (ATM) network. A computer 9 such as a desktop computer is also connected to the LAN or ATM network 5. Station apparatus such as a telephone 7, but which could be a headset, a handset or a wireless device, is in communication with the server. Alternatively, the station apparatus (which will henceforth be referred to as a telephone), can be connected to or be in communication with a telephone interface circuit in a computer 9.

A memory in the computer contains a telephone application program. In one embodiment of the invention, a further memory is in communication with the computer, e.g. via the network 5, which further memory stores a database 11. In this specification, the term database will be used as being synonymous with the further memory. The database stores files which the user would want to use, upon receiving incoming calls. For example, the files could contain personal profiles of callers, stored data describing matters to be

discussed with individual callers, accounting data relating to individual callers, etc.

Operation of the _____ one embodiment of the invention is as follows, with reference to Figure 2. Arrowed lines associated with bracketed capital letters represent process steps associated with particular apparatus. When a call is received from the public network, (A), the CTI server 1 transfers the call to telephone 7 (B). It simultaneously or immediately before or after transferring the call provides data to the computer 9 as to the identity of the calling and called lines. The identity of the calling line can be obtained from the data transferred from a remote switching system via trunks in the public switched network or via a separate data line.

The computer 9, using the identity of the calling line, accesses database 11, and retrieves a file (if it exists) which is associated with the calling line. The computer also places an icon in foreground on the display of the computer which relates to the call, and makes the file which has been retrieved from the database available for use by an application program used in conjunction with answering the call. For example, the application program could display the data in the database.

Tools for creating the display, the icons, for invoking the icons as active, and for enabling resulting operation of the application programs are well known to persons skilled in the art. For example, in the event that the computer used is the Apple MacIntosh, a tool that can be used is Hypercard, as described in the text "The Complete Hypercard Handbook", by Danny Goodman, copyright 1987, pblished by Bantam Books Inc. In the event that the computer is an IBM compatible personal

computer using a Windows 3.1 operating system, a tool that can be used is the programming techniques described in the text "Programming Windows 3.1", by Charles Petzold, copyright 1992, published by Microsoft Press.

Figure 3 illustrates a display 13 of the personal computer during the processing of several calls. For example assume that two calls have come in, and are on on hold. A first call was a conference call between two parties and the local user, which results in the application program displaying a conference call icon 15 on the display. A second call was a single party call, which results in the application program displaying a normal call icon 17 on the display. The icons are preferably transparent over the display of another application program in progress, such as a word processing file.

Now a third call is made, i.e. an incoming call. The application places an icon 19 in foreground on the display. At the same time it retrieves a file relating to the incoming call from the database. When the user invokes the icon by clicking on it using a pointing device, or by some other means such as by hitting a key on the keyboard of the computer or by voice command, the file retrieved from the database is placed on the screen for viewing by the user.

Alternatively, the data contained in the file can be used by the application program. For example, if the data in the file represents accounts receivable, the application program may analyze the data and as a result generate a display message such as "account balance nil", or "$550.00 overdue 5 months, further balance owing $350.00", etc. Voiced messages or control messages could also or alternatively be generated as a result of the data stored in the file of the database related to the incoming call. For example, the file

could contain data indicating the existance of particular bandwidth or particular apparatus used by the calling party. The application program could invoke particular apparatus as a result of analyzing the file and cause the computer to automatically connect additional or substitute channels between the called and the calling parties, such as a high data rate modem, a video channel, etc.

Rather than having the data appear on the display after activating an icon, the application program could instead immediately provide the file data of the new call on the display.

It should be noted that files relating to each of the calls have been retrieved from the database 11 and are available to the user. The retrieved files are retained in a local memory in the computer 9 after retrieval from the database, as long as an icon relating to a call is displayed on the display 13. By clicking on any icon, the user informs the application program of the icon, i.e. the call, that should be made active. As a result, the application program places the call in progress on hold (with others that may be on hold), and makes the call relating to the clicked icon active, and places the file relating to that call on the screen. The clicked icon is also preferably displayed with dominance, for example with a strong or distinctive color or shading, with bold or thick lines, etc.

Until now it was described that files are retrieved which are associated with particular incoming calling lines. This infers that each file can be looked up by calling line identification. However it should be noted that files can be made associative, e.g. they can be looked up in association with the identity of calling lines as well as the identity of called lines or with any other criteria. For example, a file can be looked

up in association with the identity of a called line as well as the time of day, or day of the week, month or year, different files, or no files being retrieved from the database depending on the time of day, or the particular day of the week, month or year.

Particular files can be retrieved depending on the identity of the called party as well as the calling line. For example, a particular file can be retrieved from the database when a particularly identified calling party calls one line, and a different file can be retrieved when the same calling party calls a different line. This could have application when different agents are called, each of which having different approval authority for a particular incalling client which has a single database. Indeed, the application program, analyzing the data stored in the file as well as the identity of the called agent, could modify the data of the file which is displayed to that agent. A different agent, having different approval authority, could have at least some different data displayed.

It will be recognized that the files can be displayed in separate resizable windows relating to each of the calls, with the window containing the file relating to the active call on top of the other windows.

In a variation of the above embodiment, calls that are for other users can be displayed in other places on the display, and calls that have different priorities can be displayed either in a separate part of the display or with distinctive colors than normal calls. The priority of a call, and the color or location on the display of a particular icon can be established by indicating to the application program the identities of incoming calls in association with particular priorities, and by setting colors and/or

display locations for calls relating to those identities.

It should also be noted that for the case in which the telephone is connected directly to the computer, invoking an icon as active can not only bring the file from the database to the foreground on the display and have data in it processed by the application program (if the application program can use the data), and display the call icon in a dominant manner, but can also perform connection of the telephone to the calling party, placing another call, if one were in progress, on hold.

Indeed, in the event the telephone is connected directly to the server as shown in Figures 1 and 2, the application program in the computer 9 can cause a command to be sent to the server to ring the telephone 7 and connect it to the public network once answered after the icon relating to the call has been made active by the user.

Rather than clicking on a call icon to make it active, the user could alternatively drag its own icon over the call icon to invoke a call to be active.

Figure 4 illustrates a preferred structure that can be used to implement the arrangement in more detail. The server contains a call control application program 21, which is linked to drivers 23. The server contains MVIP circuits 24 which interface telephones such as telephone 7 to the public network 3.

The computer 9 contains a telephone application program 25 and screen display application program 27.

In operation, and with additional reference to the process chart of Figure 5, the user establishes phone numbers which are to be dealt with by its computer 9, using the telephone application program 25. For example, the user could indicate to the application

program that it is to respond only to calls to a single telephone line identity. The telephone application program 25 then downloads instructions to call control 21 (A) to monitor, for that application program, calls to the single telephone identity.

When an incoming call arrives to the MVIP circuits 24, the drivers 23 pass this information to the call control 21 (C), which detects the identities of the incoming calling line and of the called line. The call control passes this information to the telephone application program 25 (D), which in turn directs the call control (E) to transfer the call to the telephone 7.

The telephone application program 25 then, using the identity of the calling line, the identities of both the calling and calling lines, or other criteria such as the time, day, etc., searches the database 11 for a corresponding file. It retrieves the file e.g. via LAN 5 and invoking the screen application 27, displays the retrieved file and and icon relating to the call on the display of the computer as described earlier.

The call can then progress as described earlier, with respect to anwering the call, display of dominant icon, display of files relating to the active call, etc.

It should be noted that the present invention is not restricted for use with telepone calls, but can be used for the receipt of other data such as E-mail messages. In this case, message files can be stored in a database in relation to calling and called party identities, and icons can be displayed relating to each message or relating to plural messages relating to each party transmitting a message. Upon activating an icon, the corresponding E-mail message or messages from a single party can be placed in dominance on the screen.

The invention can alternatively be used with a single computer having a telephone application circuit and database, and plural lines connected to the application circuit, rather than using the particular server-LAN architecture illustrated.

Retrieving a file in this specification should be construed to include an E-mail message or application program.

A person understanding this invention may now conceive of alternative structures and embodiments or variations of the above. All of those which fall within the scope of the claims appended hereto are considered to be part of the present invention.

CLAIMS

1. A method of processing incoming telephone calls comprising:

(a) receiving an incoming call, and routing it to a called telephone,

(b) displaying a icon related to the incoming call in a dominant manner on a computer display of a computer associated with the called telephone,

(c) automatically retrieving a file related to an identity of a calling line of the incoming call from a database,

(d) linking the file to a telephone call as the call is retreived, and

(e) providing foreground access to the file linked to the retrieved call, to an operator of the computer.

2. A method as defined in claim 1 in which the step of automatically retrieving a file related to the identity of a calling line includes retrieving said file related both to the identity of the called and calling line.

3. A method as defined in claim 1 including operating an application program on the computer, and providing said foreground access over a display associated with said application program.

4. A method as defined in claim 1 including displaying plural icons on the computer display, each associated with a call, associating files from the database with respective ones of said icons, displaying one of said icons related to one of said calls in a dominant manner on the computer display and providing

foreground access to a file associated with a call related to the dominant displayed icon, to the operator of the computer.

5. A method as defined in claim 4 in which said one of said icons relates to an active call, remaining ones of said icons relating to calls on hold or otherwise inactive.

6. A method as defined in claim 5 in which said remaining ones of said icons are transparent.

7. A method as defined in claim 5 including retaining each of said associated files in an active memory, and displaying any one of the files in a dominant manner upon making any of said calls said active call.

8. A method as defined in claim 4 including the step of placing all calls associated with icons other than the dominant displayed icon on hold.

9. A method as defined in claim 4 in which the step of automatically retrieving a file related to the identity of a calling line includes retrieving said file related both to the identity of the called and calling line.

10. A method as defined in claim 4 including operating an application program on the computer, and providing said foreground access over a display associated with said application program.

11. A method as defined in claim 10 in which the step of automatically retrieving a file related to

the identity of a calling line includes retrieving said file related both to the identity of the called and calling line.

12. A method as defined in claim 9 including the step of placing all calls associated with icons other than the dominant displayed icon on hold.

13. A method as defined in claim 10 including the step of placing all calls associated with icons other than the dominant displayed icon on hold.

14. A method of processing incoming telephone calls comprising:

(a) detecting an incoming call in a telephone server,

(b) providing data relating to a calling or called party from the server to a telephone application program in a computer associated with the called party,

(c) directing the server from the telephone application program to ring a telephone of a called party and transfer the call thereto,

(d) automatically retrieving a file from a database, by the telephone application program, and

(e) displaying from the telephone application program an icon related to the call in foreground on a display of the computer, and providing access by the called party, to said file.

15. A method as defined in claim 14, including a step preceding step (a), of the application program setting monitors in the telephone server to detect incoming calls to at least one particular telephone usable by the called party.

16. A method of processing E-Mail message comprising:

(a) receiving an incoming message, and routing it to the computer of a recipient party,

(b) displaying a icon related to the incoming message in a dominant or transparent manner on a computer display of a computer associated with the recipient party,

(c) automatically retrieving a file related to an identity of a transmitting party of the incoming message from a database, and

(d) providing foreground access to the file to an operator of the computer.

17. A method as defined in claim 1 in which the step of automatically retrieving a file related to the identity of a calling line includes retrieving said file related both to the identity of the transmitting and recipient parties.

18. A method as defined in claim 1 including displaying plural icons on the computer display, each associated with an E-Mail message, associating a file from the database with plural ones of said icons, displaying one of said icons related to one of said messages in a dominant manner on the computer display and providing foreground access to a file associated with a message related to the dominant displayed icon, to the operator of the computer.

19. A method as defined in claim 1 in which the icon that is displayed has a distinctive color or is displayed in a particular part of the display depending on priority of a call associated with the icon.

20. A method as claimed in claim 1, claim 14 or claim 16, substantially as described herein with reference to any one of the accompanying drawings.